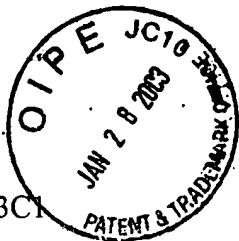


MICRON.003C1



#26/Supp.
PATENT
Appeal
Brief
2/5/03
[Signature]

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Fazan et al.
Appl. No. : 09/037,945
Filed : March 10, 1998
For : STEAMLINED FIELD ISOLATION PROCESS
Examiner : George R. Fourson III

) Group Art Unit 2823
)
) I hereby certify that this correspondence and all
) marked attachments are being deposited with the
) United States Postal Service as first-class mail in
) an envelope addressed to: United States Patent
) and Trademark Office, Attn: Board of Patent
) Appeals and Interferences, P.O. Box 2327,
) Arlington, VA 22202, on
)
) January 24, 2003
) (Date)
) [Signature]
) Adeel S. Akhtar, Reg. No. 41,394

ON APPEAL TO THE BOARD OF PATENT APPEALS AND INTERFERENCES
SECOND SUPPLEMENTAL APPEAL BRIEF

United States Patent and Trademark Office
Attn: Board of Patent Appeals and Interferences
P.O. Box 2327
Arlington, VA 22202

Dear Sirs:

In response to the Office Action mailed on October 24, 2002, Appellants request reinstatement of the Appeal, filed by Notice of Appeal on February 21, 2001. This Supplemental Appeal Brief incorporates and supplements the Appeal Brief ("Appellants' Brief") filed on March 21, 2001 and the prior Supplemental Appeal Brief ("First Supplemental Brief") filed on June 20, 2002.

I. REQUEST FOR REINSTATEMENT

Appellants respectfully request reinstatement of the appeal filed by Notice of Appeal on February 21, 2001, under 37 C.F.R. § 1.193(b)(2).

Appl. No. : 09/037,945
Filed : March 10, 1998

II. PROCEDURAL HISTORY

Appellants filed a Notice of Appeal on February 21, 2001, under 37 C.F.R. § 1.193(b)(2). On March 21, 2001, Appellants mailed Appellant's brief. The Examiner responded with a new Office Action, mailed February 20, 2002. Appellants then filed a first Supplemental Appeal Brief, which was mailed on June 20, 2002. The Examiner responded with a second Office Action, mailed October 24, 2002. Appellants herein seek reinstatement of the appeal by filing the present Second Supplemental Appeal Brief.

III. STATUS OF THE AMENDMENTS

An Amendment and Response to Office Action was mailed on January 24, 2003, in which Appellants requested the amendment of Claims 16 and 17 to depend from Claim 14, rather than previously canceled Claim 15. This Amendment and Response was responsive to the second Office Action (mailed October 24, 2002), in which the Examiner rejected Claims 16 and 17 under 35 U.S.C. § 112, second paragraph, as depending from previously canceled Claim 15. The Examiner nonetheless treated Claims 16 and 17 as if they depended from Claim 15 for the purposes of the Office Action. The appealed claims, including this proposed amendment are attached hereto as Appendix A.

IV. SUPPLEMENTAL ISSUES BEFORE THE BOARD

Appellants submit that the Office Action of October 24, 2002 differs from previous Office Actions in that the Examiner has merely withdrawn the rejection of Claims 11-12 under 35 U.S.C. § 103 over Marshall et al in view of Sze, and replaced it with a rejection over Germany '885 in view of Marshall et al. At the same time, the Examiner has also added a rejection of Claims 16-17 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, which are addressed by

Appl. No. : 09/037,945
Filed : March 10, 1998

the Amendment and Response to Office Action filed herewith. In addition, the Examiner has shifted the basis of rejection for various claims between rejections based on Germany '885 alone, and those rejections based on Germany '885 in view of Marshall et al.

However, the essence of the Examiner's prior art rejections remains the same. Each of the rejections still relies on the Examiner's modification of German Patent No. 26885 (Germany '885) to omit an initial wet oxidation stage that is expressly taught by Germany '885. Accordingly, the arguments set forth in Appellant's brief (filed March 21, 2001), and the First Supplemental Brief (mailed on June 20, 2002) remain applicable.

Appellants have filed a timely Notice of Appeal, including the applicable appeal fee, and twice attempted to request Board review of the present case. However, in response to each of Appellants' two prior requests for Board review, the Examiner has issued a new Office Action that relies on the same modification of Germany '885, which Appellants have repeatedly argued has no motivation in the art. Appellants respectfully submit that, as Appellants have fulfilled the requirements for appeal under 37 C.F.R. §§1.191-1.193, appeal of rejections based on the same grounds (*i.e.*, unmotivated modification of Germany '885) is proper. Accordingly, Appellants respectfully request the Board's review of the Examiner's rejections in light of the issues outlined herein and in Appellants' Brief and The First Supplemental Brief.

V. APPELLANTS' ARGUMENT

As noted above, each of the Examiner's rejections continues to depend upon a modification of Germany '885, whereby the Examiner asserts that it would have been obvious for the skilled artisan to omit the wet oxidation step taught by Germany '885. In particular, the Examiner continues to state the following:

Appl. No. : 09/037,945
Filed : March 10, 1998

It would have been within the scope of one of ordinary skill in the art to omit the first stage oxidation with the expectation that the concomitant disclosed advantages of such a step would not be obtained because, in view of the above pointed to disclosure, the process *could* be performed without the first stage oxidation, although taking longer.... Note also that the reference indicates that Kooi ribbon, or nitride formed during the first stage employed, is eliminated in the second stage.

February 20, 2002 Office Action at pp. 3-4 and October 24, 2002 Office Action at p. 3 (emphasis added).

Additionally, in a Response to Argument section, the Examiner states that "the reference suggests elimination of the step in disclosing the function of the step *in the event* that the disclosed function is not desired to be obtained." February 20, 2002 Office Action at p. 4 and October 24, 2002 Office Action at p. 4 (emphasis added).

This begs the question. In essence, the Examiner states that no more than that the recited invention *could* be performed *if* desired. However, it is the very desirability that the Examiner has not shown, and it is that very desirability that the Examiner must show in order to provide a legally sound suggestion to modify. "The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification." In re Gordon, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984). The Examiner has not shown any statement from the prior art suggesting the *desirability* of omitting the wet oxidation step. By giving only a *disadvantage* to omitting the wet oxidation, the Examiner has not provided the requisite suggestion from the prior art. Rather, the Examiner *assumes* some desirability to omit the wet oxidation. Otherwise, the skilled artisan would clearly not have omitted the wet oxidation step, knowing only of disadvantages to doing so.

Applicants have taught, in the present application, that, in the first place, omission of wet oxidation and use of only dry oxidation would avoid the Kooi effect. Moreover, Applicants have

Appl. No. : 09/037,945
Filed : March 10, 1998

additionally taught that it would be desirable, in the context of field oxidation, to omit that effect, so much so that it would be worth the loss in speed from omission of wet oxidation.

The Examiner's reference to Germany '885 noting that the nitride formed during the first stage is "eliminated" in the second stage does not provide this teaching. Rather, the "elimination" of a previously-formed nitride inclusion results from the use of HCl and/or chlorocarbon gas during the second stage of processing. It is these additional chemicals, and not the omission of wet oxide, that eliminates the Kooi effect, in the process taught by Germany '885.

The Examiner also states that "Applicant argues that the reference must disclose elimination of the first oxidation step." February 20, 2002 Office Action at p. 5 and October 24, 2002 Office Action at p. 4. However, Applicants respectfully disagree and have not asserted that the reference must teach omitting the step. Rather, Applicants continue to argue that the Examiner must provide a *suggestion* from the prior art to eliminate the step. Applicants submit that the Examiner has failed to provide this suggestion.

The Examiner further argues that the combination is proper because "all references relied on are directed to formation of field oxide by local oxidation of Silicon and thus are seen to be analogous." February 20, 2002 Office Action at p. 5 and October 24, 2002 Office Action at p. 4. In response, Appellants assert that the Examiner must show more than the mere fact that references are from the same field. Accordingly, Applicants reiterate that the Examiner has failed to provide an adequate suggestion to combine the references.

In view of the above, Appellants maintain that the Examiner has continued to fail to provide a sufficient suggestion from the prior art to combine the references, and has rather engaged in an inadvertent application of hindsight in view of Appellants' own invention.

Appl. No. : 09/037,945
Filed : March 10, 1998

VI. CONCLUSIONS

To summarize, Appellants submit that the Examiner has not provided any teaching, suggestion or motivation from the prior art to combine the asserted references. While the Examiner has provided references teaching a wet oxidation followed by a dry oxidation, the Examiner has in essence asserted no more than that the prior art *could* have been modified to omit the wet oxidation and arrive at the claimed invention, with the understanding that the process would simply take longer. The Examiner has not provided any indication from the prior art that it would have been *desirable* to omit the wet oxidation, such as to make up for the loss in time. Accordingly, there is no motivation to combine the references absent impermissible hindsight.

Appellants respectfully submit that, as Appellants have fulfilled the requirements for appeal under 37 C.F.R. §§1.191-1.193, appeal of rejections based on the same grounds is proper. Accordingly, Appellants respectfully request the Board's review of the Examiner's rejections in light of the issues outlined herein and in Appellants' Brief and First Supplemental Brief.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: January 24, 2003

By: Adeel S. Akhtar
Adeel S. Akhtar
Registration No. 41,394
Attorney of Record
2040 Main Street
Fourteenth Floor
Irvine, CA 92614
(415) 954-4114

APPENDIX A

APPEALED CLAIMS AFTER AMENDMENT OF 1/24/03:

1. A process of forming an integrated circuit, comprising:
growing a silicon dioxide field isolation region on a semiconductor wafer without forming silicon nitride inclusions in said field isolation region exclusively by means of a hydrogen-free oxidant at a pressure less than about 30 atm; and
forming a gate oxide without a prior sacrificial oxidation.
2. The process of Claim 1, wherein the oxidant consists essentially of oxygen.
3. The process of Claim 1, wherein forming the field isolation region comprises exposing the semiconductor substrate to the oxidant at an oxidant partial pressure greater than 5 atm.
4. The process of Claim 3, wherein forming the field isolation region comprises maintaining the semiconductor substrate at a temperature greater than 900 °C.
8. A field isolation region among integrated circuit devices on a semiconductor substrate formed by a process comprising:
avoiding the formation of silicon nitride inclusions in the field isolation region by exposing a field region of the semiconductor substrate to a hydrogen-free oxidizing ambient at a pressure between about 5 atm and 30 atm.
9. The field isolation region of Claim 8, wherein the semiconductor substrate is maintained at a temperature greater than 900 °C while exposing the field region.
11. A process of forming electrically isolated integrated devices in a silicon substrate, comprising:
masking portions of the substrate to define unmasked field isolation regions;
growing field oxide in the field isolation regions without forming silicon nitride inclusions in the field oxide by hydrogen-free oxidation alone at an oxidant partial pressure between about 5 atm and 30 atm and a temperature of greater than about 900°C; and
forming electrical devices between the field isolation regions.
12. The process of Claim 11, wherein growing the field oxide comprises exposing the field isolation regions to an oxidant consisting essentially of oxygen.

14. A process of forming an integrated circuit on a semiconductor substrate, comprising:

masking portions of the substrate with a mask comprising silicon nitride;
growing a field oxide in a single process step by hydrogen-free oxidation alone to a thickness sufficient for electrical isolation of devices within the substrate without forming silicon nitride inclusions therein;

removing the mask after growing the field oxide; and
forming a gate oxide of uniform thickness adjacent the field oxide on the semiconductor substrate without performing a prior sacrificial oxidation.

16. (Amended) The process of Claim 14, wherein growing the field oxide further comprises maintaining the oxidant partial pressure at about 5-30 atm.

17. (Amended) The process of Claim 14, wherein growing the field oxide further comprises maintaining the substrate at greater than about 900°C.